ABSTRACT OF THE DISCLOSURE

Phase noise is at least partially cancelled for an interferometric system by using a delay/phase cross-correlation approach for two interferometers within the system. The cross-correlation approach may be used in measuring group delay of a device under test and includes determining the differences between the phase of the output of each interferometer at time t and the phase of the same output at the time t minus the delay of the other interferometer. In one embodiment, the first phase difference is the difference between the phase of a test interferometer output at time t and the phase of the test interferometer output at the time t offset by the known delay of a reference interferometer. The second phase difference is calculated using the same technique, but the time offset is a delay representative of the relative delay of two light propagations within the test interferometer. A noise-cancelled time series output that is indicative of group delay can then be generated by determining the difference between the first and second differences.